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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,294	08/31/2006	Tadahiro Ohmi	295570US26X PCT	9200

22850 7590 11/05/2008

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EXAMINER	
VINH, LAN	

ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
11/05/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/591,294	OHMI ET AL.	
	Examiner	Art Unit	
	LAN VINH	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/12/2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. A non-final office action is discussed below to address all the pending claims 1-17

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Itatani et al (US 5,188,862)

Itatani discloses a microwave plasma generating apparatus comprises: an oscillator which outputs electromagnetic wave (col 4, lines 5-20) a first waveguide 1 whose section perpendicular to its axis is rectangular (fig, 7A). which reads on a first square waveguide since the applicants discloses that a square waveguide is a waveguide whose section perpendicular to its axis is rectangular on page 3 of the instant specification, the waveguide to be connected to said oscillator (col 5, lines 30-34) a second waveguide 16 whose section perpendicular to its axis is rectangular (fig, 7A). which reads on a second square waveguide since the applicants discloses that a square waveguide is a waveguide whose section perpendicular to its axis is rectangular on page 3 of the instant specification, the waveguide 16 having front and back openings (fig. 7A), the first square waveguide and said second square waveguide communicate

with each other through a communication hole formed in one narrow wall of each of the first square waveguide and said second square waveguide (fig. 7B)

Regarding claim 2, Itatani discloses that the first square waveguide 1 comprises a guide wall which projects from the other narrow wall toward the communication hole and guides the electromagnetic waves 8 propagating in said first square waveguide toward the communication hole (fig. 7B)

Regarding claim 3, fig. 7B of Itatani shows that the electromagnetic waves 8 which are reflected by said guide wall and travel in an opposite direction in said square waveguide and the electromagnetic waves which are reflected by an end of said first square waveguide cancel each other

3. Claims 1-2, 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Tahim (US 5,265,268)

Tahim discloses a microwave mixer comprises: an oscillator which outputs electromagnetic wave (col 4, lines 5-20) a first waveguide 14 whose section perpendicular to its axis is rectangular (fig. 1). which reads on a first square waveguide since the applicants discloses that a square waveguide is a waveguide whose section perpendicular to its axis is rectangular on page 3 of the instant specification, the waveguide to be connected to said oscillator (col 3, lines 40-45)

a second waveguide 12 whose section perpendicular to its axis is rectangular (fig 1). which reads on a second square waveguide since the applicants discloses that a

square waveguide is a waveguide whose section perpendicular to its axis is rectangular on page 3 of the instant specification, the waveguide 12 having front and back opening , the first square waveguide and said second square waveguide communicate with each other through a communication hole formed in one narrow wall of each of the first square waveguide and said second square waveguide (fig. 1)

Regarding claim 2, Tahim discloses that the first square waveguide 14 comprises a guide wall which projects from the other narrow wall toward the communication hole and guides the electromagnetic waves propagating in said first square waveguide toward the communication hole (fig. 2)

Regarding claim 5, Tahim discloses that the waveguide 12 comprises a conductive column 78 located in the communication hole (col 4, lines 62-66)

4. Claims 7-8, 10, 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Itatani et al (US 5,188,862)

Itatani discloses a microwave plasma generating apparatus comprises: a stage 15 to place a target object 14 thereon, a processing chamber 13 to accommodate the stage 15 (fig. 7A), an antenna assembly having a plurality of radation waveguide with slots (fig. 11), a demultiplexer comprises: an oscillator which outputs electromagnetic wave (col 4, lines 5-20)

a first waveguide 1 whose section perpendicular to its axis is rectangular (fig, 7A). which reads on a first square waveguide since the applicants discloses that a square waveguide is a waveguide whose section perpendicular to its axis is rectangular on

page 3 of the instant specification, the waveguide to be connected to said oscillator (col 5, lines 30-34)

a second waveguide 16 whose section perpendicular to its axis is rectangular (fig, 7A). which reads on a second square waveguide since the applicants discloses that a square waveguide is a waveguide whose section perpendicular to its axis is rectangular on page 3 of the instant specification, the waveguide 16 having front and back openings (fig. 7A), the first square waveguide and said second square waveguide communicate with each other through a communication hole formed in one narrow wall of each of the first square waveguide and said second square waveguide (fig. 7B)

Regarding claim 8, Itatani discloses that the waveguide has a standing wave driving slot 7 on the other end of a sidewall (fig. 11)

Regarding claim 10, Itatani discloses that the waveguide 16 comprises a reflecting member 12 which is arranged on a side of one end and reflect part of the traveling waves (col 12, lines 37-40; fig. 7B)

Regarding claim 15, Itatani discloses using two/ plurality of oscillators (col 5, lines 30-38)

Regarding claim 16, Itatani discloses a plurality of microwave supply devices including antenna assemblies 24 (col 7, lines 34-36)

Regarding claim 17, Itatani discloses that the other end of one radiation waveguide 1 opposes that of the other radiation waveguide 16 (fig. 7A)

5. Claim 12 is rejected under 35 U.S.C. 102(b) as being anticipated by Itatani et al (US

5,188,862)

Itatani discloses a microwave plasma generating apparatus comprises:
introducing electromagnetic waves propagating in a waveguide 1 into a second waveguide 16 through a communication hole formed in one narrow wall of each of the first waveguide and the second waveguide; the waveguides 1 and 16 having section perpendicular to their axis is rectangular (fig, 7A, col 5, lines 10-35), which reads on introducing electromagnetic waves propagating in a first square waveguide into a second square waveguide through a communication hole formed in one narrow wall of each of the first waveguide and the second waveguide a second square waveguide since the applicants discloses that a square waveguide is a waveguide whose section perpendicular to its axis is rectangular on page 3 of the instant specification and distributing the electromagnetic waves introduced into the second square waveguide 16 to a plurality of waveguides 1, 16 through a plurality of openings formed in the second square waveguide (col 5, lines 56-65; fig. 8)

6. Claim 13 is rejected under 35 U.S.C. 102(b) as being anticipated by Itatani et al (US 5,188,862)

Itatani discloses a process for the preparation of diamond film utilizing microwave plasma. The process comprises:
introducing electromagnetic waves propagating in a waveguide 1 into a second waveguide 16 through a communication hole formed in one narrow wall of each of the first waveguide and the second waveguide; the waveguides 1 and 16 having section

perpendicular to their axis is rectangular (fig, 7A, col 5, lines 10-35), which reads on introducing electromagnetic waves propagating in a first square waveguide into a second square waveguide through a communication hole formed in one narrow wall of each of the first waveguide and the second waveguide a second square waveguide since the applicants discloses that a square waveguide is a waveguide whose section perpendicular to its axis is rectangular on page 3 of the instant specification and distributing the electromagnetic waves introduced into the second square waveguide 16 to a plurality of waveguides 1, 16 through a plurality of openings formed in the second square waveguide (col 5, lines 56-65; fig. 8)
supplying the electromagnetic wave introduced into the waveguide to a processing vessel 13 through a slot formed in each of the radiation waveguide (fig. 7A-7B)
processing a target 14 placed in the processing chamber using a plasma which is generated by the electromagnetic waves supplied to the vessel (col 5, lines 20-35)

Claim Rejections - 35 USC § 103

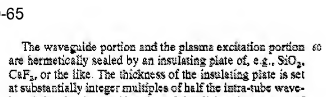
7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 9, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itatani et al (US 5,188,862) in view of Ohmi et al (6,690,702)

Itatani apparatus has been described above. Unlike the instant claimed inventions as per claims 4, 9, 11, Itatani fails to disclose that the end of the first square waveguide is arranged/the standing wave driving slot is formed at a position away from the guide wall by an integer multiple of substantially 1/2 a tube wavelength of the first square waveguide/the specific position of the reflecting member

Ohmi, in an apparatus for excimer laser using microwave, discloses in col 11, lines 50-65


The waveguide portion and the plasma excitation portion are hermetically sealed by an insulating plate of, e.g., SiO_2, CaF_2, or the like. The thickness of the insulating plate is set at substantially integer multiples of half the intra-tube wavelength λ_g also in consideration of the dielectric constant of the insulating plate.

Ohmi serves as an evidence that dimensions of elements of a waveguide vary with the tube wavelength/are result-effective variables. Thus, one skilled in the art at the time the invention was made would have found it obvious to arrange the end of the first square waveguide/to form the standing wave driving slot at any desirable positions by conducting routine experimentation in order to optimize the result-effective variables

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itatani et al (US 5,188,862) in view of Inouchi (US 6,184,624)

Itatani apparatus has been described above. Unlike the instant claimed invention as per claim 6, Itatani fails to disclose that the first and second square waveguides have different relative dielectric constant

Inouchi discloses that the amount of the microwave power pass through the waveguide depend on the dielectric constant of the waveguide (col 5, lines 45-55)

Thus, one skilled in the art at the time the invention was made would have found it obvious to modify Itatani apparatus by using the first and second square waveguides have different relative dielectric constant in view of Inouchi teaching in order to more controllable microwave power distribution in the chamber

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Itatani et al (US 5,188,862) in view of Choe et al (US 20040250954)

Itatani method has been described above. Unlike the instant claimed inventions as per claim 14, Itatani fails to disclose subjecting a surface of an LCD substrate arranged in the processing chamber to a process such as etching utilizing a plasma generated by electromagnetic wave supplied to the vessel

Choe discloses a method for dry etching LCD using plasma generated by electromagnetic wave (para 0019)

One skilled in the art at the time the invention was made would have found it obvious to have employed Itatani method to dry etch a LCD substrate in view of Choe teaching because Choe discloses that

[0005] In a process of manufacturing a liquid crystal display (LCD), a capacitively coupled plasma (CCP) method, an inductively coupled plasma (ICP) method, etc. are being used to form plasma. Particularly, the ICP method that uses an inductive electromagnetic field by generating plasma is widely used because it is possible to form high-density plasma and it is easy to control ion energy by using bias power. On the other hand, the CCP method forms low-density plasma as compared with the ICP method, but is also widely used for etching because it has advantages of a simple equipment, etc.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is (571)272-1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lan Vinh/
Primary Examiner, Art Unit 1792